THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland
Volume 31 — September 15, 1947 — Number 9

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DOWNY MILDEW ON WHEAT IN NEW YORK

G. C. Kent, L. J. Tyler, N. F. Jensen

Wheat, variety Yorkwin grown in an increase plot on Caldwell Field at Ithaca was found infected with downy mildew on July 18. The infected plants were first noted by the distorted heads with fleshy green glumes, abnormally long awns, spreading of the glumes and slight phyllody. The affected culms were one-half to three-fourths normal height. Other culms from the same plant were frequently less than one-half the height of uninfected culms and had failed to head. In a few cases apparently unaffected culms grew from plants with affected culms.

The plants were mature at this time with no green leaves on unaffected culms. The flag leaf on infected plants usually showed some chlorophyll still present. The leaves on infected plants were filled with typical oospores of the downy mildew fungus Sclerospora macrospora Sacc. and also had abundant pycnidia of Septoria tritici and clusters of conidiophores of Alternaria tenuis. No oospores were found in the leaf sheaths or awns.

Approximately thirty infected plants were found within an area 25 x 5 feet in a low wet area on the south edge of the field. No infected plants were found over five feet inside the edge of the field next to a roadway.

Several plants showing similar symptoms were found in a guard row in a dwarf bunt plot at Perry, New York. These plants were also mature and the oospores could not be definitely distinguished with a hand lens. On teasing the leaf blades apart numerous oospores were observed. As at Ithaca, the infected plants were in a row in a low wet strip at the edge of the field.

Oospores teased from the leaf blades agreed in size and configuration with a specimen of Sclerospora macrospora Sacc. collected on wheat at Jordan, Kentucky on May 17, 1921 by W. H. Weston and deposited as specimen No. 11873 in the Herbarium of the Plant Pathology Department at Cornell University.

DEPARTMENTS OF PLANT PATHOLOGY AND PLANT BREEDING, ITHACA, NEW YORK

RUSTS OF WHEAT AND RUSTS AND HELMINTHOSPORIUM BLIGHT OF OATS AT DENTON, TEXAS IN 1947

I. M. Atkins

The crop season which ended was almost ideal from the standpoint of plant breeding. Low temperatures in January gave us the best information we have ever had on hardiness of oats, barley and wheat strains in experimental tests. The spring season was moderate with sufficient moisture for the crop and while diseases became epidemic before maturity in most instances, they did not seriously injure the yields or quality of grain.

Leaf rust [Puccinia rubigo-vera var. tritici] of wheat was slow in developing in the spring and before maturity it became sufficiently serious to give excellent readings on all breeding material. Because of new races of rust which have increased in recent years a considerable portion of new strains which previously had shown moderate to high resistance to leaf rust were fully susceptible or moderately susceptible. With the development of heavy rust infection on Austin wheat and other strains which were developed from crosses on Hope wheat we shall have to discard many strains which previously appeared promising.

Stem rust [P. graminis var. tritici] of wheat was of minor importance in commercial fields in this area although some inoculum was built up in the eastern part of this county before the soft wheats of that area matured. In our breeding nursery very good information was obtained on a reaction of all strains but the infection was not high enough in the yield tests to seriously influence the quality of grain. Stem rust increased in the Rolling Plains and the southern part of the Panhandle area and at one time appeared to be in danger of injurying the crop. However, dry weather reduced the rate of spread to such an extent that very little damage resulted.

Crown rust [P. coronata] of oats was only of minor importance in commercial fields in this area and very little was observed in West Texas. Stem rust [P. graminis var. avenae] of oats was slightly more important in this area and infection centers in many fields caused moderate damage but there was no great damage to the general crop. By means of spreader rows sufficient information on both these diseases was obtained in the breeding nursery to give us satisfactory information on most of the strains being tested. Helminthosporium blight was severe in the breeding nursery so that excellent information on the reaction of oat strains was obtained. Few reports of infection in commercial fields indicated that moderate damage was done to Fultex oats in this area. However, farther west in the State apparently Fultex was not damaged.

DIVISION OF CEREAL CROPS AND DISEASES, DENTON, TEXAS

CEREAL DISEASES IN KANSAS IN 1947

C. O. Johnston

The fall of 1946 and winter of 1946-47 were favorable for winter wheat and barley in Kansas. Precipitation was abundant and well distributed and subsoil moisture had the deepest penetration observed for many years. Except for one brief period in early January when the temperature sank to -31° F. there were no very severe cold spells. Snow cover was fairly abundant during the coldest weather and winter grains came through the winter in excellent condition.

Heavy rains in the western half of the State in the late summer and early fall of 1946 favored the growth of much volunteer wheat. By the middle of October this volunteer and much of the early sown wheat were very heavily infected with leaf rust (Puccinia rubigo-vera tritici). At Manhattan, leaf rust was heavy on early experimental sowings by the last week in October and on some later sowings by the middle of November, but most commercial fields had only bare traces of infection. Leaf rust persisted in abundance until the severe freezes of early January after which it disappeared rapidly.

The spring of 1946 was late, cold, and wet. Almost continuous cold wet weather persisted throughout March and April, greatly interfering with all spring farm work, especially oat sowing. As a consequence much of the acreage intended for oats never was sown and much of what was sown went into the ground too late for best yields.

Although the cold wet weather was not particularly unfavorable for cereals, it resulted in delayed development and late maturity. Throughout the spring wheat, oats, and barley were about 2 weeks behind normal in development. This situation posed a very definite rust hazard, but fortunately temperatures remained too low for abundant infection and the rapid development of rusts. As a consequence, rust losses were far below average in 1947 for all rusts with the possible exception of stem rust of oats.

For the State as a whole, leaf rust of wheat was extremely light in 1947. Fairly heavy infections developed in the western third of the State late in the season and undoubtedly caused some loss, but many localities in central and eastern counties had low infections right up to maturity. The heavier infections in western counties seem to have moved into Kansas from western Oklahoma and the Panhandle of Texas where infections were heavy earlier. In general, 1947 definitely was not a "leaf rust year" in Kansas.

Stem rust of wheat (P. graminis tritici) also was extremely light in

Kansas in 1947, although a few small local areas of heavy infection were reported from the western third of the State. In many fields stem rust was either absent or so light it was difficult to find until just before maturity when a few scattered pustules could be found.

Some diseases of wheat were much more abundant than usual in 1947. The long cool wet spring favored the widespread development of powdery mildew (Erysiphe graminis tritici) and never before in the writer's experience has that disease been so general and so severe. It even developed heavily in some upland fields; and in some lowland fields infection was heavy almost to the flag leaves. The same environmental conditions favored unusually heavy infections of scab (Gibberella saubinetii) in the eastern part of the State. This disease seldom causes much loss in Kansas but some fields in eastern counties definitely were damaged by scab in 1947. Another wheat disease that was unusually severe was speckled leaf blotch (Septoria tritici). This disease caused premature drying of the leaves in a wide area in southern Kansas. The heaviest infection seemed to be in a strip about three counties wide along the entire southern border of the State. Heavy infections had developed even on flag leaves by the first week in June and sharp differences in varietal susceptibility could be distinguished in experimental material.

Take-all (Ophiobolus graminis) and other foot-rots of wheat were fairly abundant, especially in southwestern counties. A little take-all was seen in the eastern part of the State but only in occasional fields. Bunt (Tilletia foetida) was found in occasional fields but usually in small amounts. Loose smut (Ustilago tritici) was less abundant than in recent years, probably due to unfavorable conditions for infection in 1946. Many fields had no loose smut or only the barest traces. This is a definite reversal of the trend for the last few years which has been for yearly increases in the amount of loose smut.

Rusts on oats were lighter than usual in 1947 although some fields of susceptible Kanota and Fulton were heavily infected with stem rust (Puccinia graminis avenae) just before harvest. However, most of the acreage was sown to resistant varieties which were only lightly infected. Crown rust (P. coronata) infection was light and in many fields was absent. Helminthosporium blight (Helminthosporium victoriae) was present in varying amounts in most fields of susceptible varieties in the eastern half of the State. Some fields had only traces, while others were severely damaged. Osage and Tama seemed to be more susceptible than Neosho and Vicland but all varieties with Victoria in their parentage had more or less of the disease. Light infections of anthracnose (Colletotrichum graminicolum) were observed in southeastern counties.

KANSAS AGRICULTURAL EXPERIMENT STATION, MANHATTAN

BACTERIAL TWIG AND BLOSSOM BLIGHT OF RASPBERRY IN MAINE

Donald Folsom

In the early part of August, considerable injury was observed, on Latham red raspberry plants, which seems to be identical with the bacterial disease reported by S. G. Lehman as occurring in North Carolina in 1932 (Phytopathology 23: 21, 1932). Part of the leaf may be infected apparently starting at the junction of leaflet and rachis; the rachis is purplish black and the leaflets have veins blackened and adjoining blade tissue brownish black. The infection may progress from leaf into stem. Usually the leaf then dies and remains, black and dried, on the stem. The infection goes up and down the stem from such a leaf, forming purplish black bands on the stem and sometimes blisters full of bacteria in the young bark. The upper part of the shoot may be dead, black and curved. Infection may start in a fruit cluster and work down into the stem. Sticky, milky drops full of bacteria may ooze from the leaflet near infected veins, or from the stem lesions. Examination of Maine specimens led a New Hampshire horticulturist to state that a similar disease has recently been observed in New Hampshire. A letter from Dr. Lehman states that the disease was found again in North Carolina last June.

MAINE AGRICULTURAL EXPERIMENT STATION
ORONO, MAINE

DOWNY MILDEW ON BURLEY TOBACCO IN THE FIELD

Luther Shaw

During the past ten days (July 14 to 24) downy mildew [*Peronospora tabacina*] has become quite prevalent in burley tobacco in the field in the vicinity of Waynesville, North Carolina. Scattered infections in the field have been evident since transplanting, however, general infections did not become evident until the period mentioned above. During this period minimum nightly temperatures have ranged from about 40 to 50° F. Rainfall has been light, however, the nights and early mornings have been accompanied by heavy fogs. Most of the tobacco has from 15 to 20 leaves and ranges from 2 to 3 feet in height. Downy midew is evident only on the lower leaves of the plants. In most cases the individual lesions are very small (1/8 to 1/4 inch in diameter), however, in some fields they are so numerous that definite damage has been caused.

DIVISION OF TOBACCO, MEDICINAL, AND SPECIAL CROPS, WAYNESVILLE, NORTH CAROLINA

TWIG BLIGHT OF GOLDEN BELL, FORSYTHIA VIRIDISSIMA LINDL.

Frederick A. Wolf

In spring, in the vicinity of Durham, North Carolina occasional twigs of golden bell may be noted to have become blighted. This occurs shortly after the plants have ceased flowering. Upon closer inspection it may be seen that slightly sunken, discolored lesions are present, which girdle the twigs, and that the parts distal to the lesions are killed.

The cortical tissues of lesions, when microscopically examined, were found to be profusely occupied by hyphae. Tissue plantings from such invaded tissue on potato dextrose agar yielded an organism having loose cottony mycelium, dark appressoria, and black sclerotia. These sclerotia, when buried in sand, that was occasionally moistened, remained dormant for about nine months, whereupon from each sclerotium one or more stalked apothecia were produced. These features made it possible to identify the causal fungus as Sclerotinia sclerotiorum (Lib.) Massee.

Sclerotinia sclerotiorum is of especial interest because of its world wide distribution and its wide suscept range. It has been reported to attack a large number of species of garden, field and pasture crops, involving any or all organs and tissues. It is not so well known as being pathogenic to woody species. Its ability to attack golden bell, a shrubby plant, stimulated the writer to search the literature for records of its pathogenesis to woody species. These records disclose that S. sclerotiorum has been noted to induce a blight of twigs and larger branches of citrus in Chile, Palestine, New South Wales, and California; and a twig blight of figs in Texas and Chile; of guayule in California; of apricot in South Africa; and of Camellia japonica in Chile.

Present observations indicate that S. sclerotiorum also causes a blossom blight of golden bell and that it gains entrance to the twigs by way of the flowers. Flowers or flower parts are well-known to provide the infection court for various other species of Sclerotiniaceae.

DEPARTMENT OF BOTANY, DUKE UNIVERSITY, DURHAM, NORTH CAROLINA

MIMOSA WILT FOUND NEAR WASHINGTON, D. C.

Curtis May

Mimosa wilt caused by the fungus, Fusarium perniciosum Hepting, has been found at Silver Spring, Maryland, a suburb of Washington, D. C. On one property three trees standing within 50 feet of one another have died from the disease this year, and according to the householder one tree with similar symptoms died in 1946. In the three trees affected this year the brownish discoloration of the wood that develops in trees affected with mimosa wilt was present only in the current annual ring of growth.

Mimosa wilt has been very destructive in many localities in the Southeast. In and around Washington, D. C., the mimosa, Albizzia julibrissin Duraz., is a common and popular flowering ornamental tree. Although no control methods are available to save diseased trees, some promising resistant selections are being propagated and tested at our Asheville, North Carolina field station. In U. S. Dept. of Agr. Cir. 535 entitled, "A Vascular Wilt of the Mimosa Tree (Albizzia julibrissin)" the disease and the causal fungus are described.

DIVISION OF FOREST PATHOLOGY

VIRUSLIKE SYMPTOMS ACCOMPANYING BIRCH DIEBACK

J. R. Hansbrough and Donald C. Stout

Dieback of birch, a disease causing enormous damage in New England and Canada, has been the subject of much discussion and investigation, particularly by entomologists, during the past decade. Examination of birch trees during June and July 1947, near Bingham, Maine, well within the dieback area, has revealed the presence of certain abnormalities frequently associated with virus diseases of trees and other plants. Prominent among the abnormalities noted was vein-clearing in the leaves of white and yellow birch trees and of sprouts arising from stumps of mature white birch trees cut one or two years previously. The occurrence of vein-clearing in forced growth of some kinds of plants is often indicative of virus activity. Other abnormalities of the affected birch trees include reduction of leaf size, cupping of leaves, curling of foliar and flowering parts, development of adventitious buds, and twisted branches. Some broomlike growth was observed on white birch stump sprouts. Attempts are being made to obtain transmission of the disease by grafting.

DIVISION OF FOREST PATHOLOGY

PHLOEM NECROSIS OF AMERICAN ELM FOUND IN LINCOLN, NEBRASKA

J. E. Livingston

Phloem necrosis [virus] of American elms is continuing its westward progress and has been identified in Lincoln, Nebraska, this summer. About fifteen trees have died and are being removed as rapidly as possible. All except two of the trees are located in a relatively small area of six to eight blocks in diameter. The two exceptions are about two miles distant. One of these was suspected of being diseased in the fall of 1946.

Phloem necrosis has now been observed in Richardson and Lancaster Counties. The infected trees in Lincoln represent the most northwestward point of advancement of the disease.

NEBRASKA AGRICULTURAL EXPERIMENT STATION, LINCOLN

SIMPLE NAMES FOR PEST CONTROL CHEMICALS

Donald E. H. Frear

I heartily agree with Dr. Horsfall (PDR 31: 268. 1947) and Dr. Knorr (PDR 31: 211-212. 1947) that something should be done--and done soon--about assigning simple names to pest control chemicals. As a chemist, I favor chemical names, of course, because they have a definite meaning to me, and if a given compound is correctly named, I can visualize its structure, or at least draw a picture of it.

For the non-chemist, however, many chemical names are as incomprehensible as if they were written in a foreign language. Furthermore, many of them are so cumbersome that it is out of the question to use them in ordinary writing. For example, try writing a paragraph in which the name "gamma isomer of 1,2,3,4,5,6-hexachlorocyclohexane" is mentioned a few times.

The answer, it seems to me, lies in the coining of "trivial" names, short enough to be said in one mouthful, and sufficiently different from each other so that the possibility of confusion cannot exist. I agree with Dr. Knorr that initial letters are not satisfactory: there is too much chance for confusion, and meaningless combinations of letters are not easily remembered. Rather, I think that a name like "Chlordane" is to be preferred. I believe that the group which coined this name, and took the necessary steps to pre-empt the name by trade mark registration, deserves a great deal of credit.

The synthesis of new names is no easy matter, and the names chosen are not always going to be popular. I believe that a joint committee of plant pathologists and entomologists should be formed as soon as possible, and should be empowered to choose "trivial" names for tested compounds in common use. Such a committee should have several representative chemists, plant pathologists, and entomologists among its members. The Economic Entomologists already have a committee on this subject.

PENNSYLVANIA STATE COLLEGE
STATE COLLEGE

PROGRESS REPORT ON LATE BLIGHT

DEVELOPMENT OF POTATO LATE BLIGHT IN PRINCE EDWARD ISLAND: Potato late blight was found July 22 in a field at Queen's Arms, near Charlottetown. The fungus is very active and because of the very high humidity the spores are being produced abundantly. According to the latest weather reports the present humid period is expected to continue for sometime. -- L. C. Callbeck, Dominion Laboratory of Pathology, Charlottetown, July 23.

The late blight found in Green Mountains on July 22 near Charlottetown, originated from a small cull pile at the edge of a wood near the field. A single infected field was found near Souris, Kings County, on July 30. -- I. L. Conners, Canada Department of Agriculture, Central Experimental Farm, Ottawa, Ontario. August 5.

POTATO LATE BLIGHT IN NEW BRUNSWICK: Sporadic outbreaks of late blight of potato reported in Grand Falls and Plaster Rock areas of Victoria County. Infections slight. -- J. L. Howatt, Canada Department of Agriculture, Central Experimental Farm, Ottawa, Ontario, August 8.

POTATO LATE BLIGHT IN QUEBEC: Numerous late blight infections in four potato fields reported by E. Lavallee at St. Martin, Laval County, August 2. -- I.L. Conners, Canada Department of Agriculture, Central Experiment Farm, Ottawa, Ontario. Telegram, August 5.

LATE BLIGHT IN ONTARIO: We have received the following report of late blight on potato in Renfrew County, eastern Ontario: heavy in one quarter acre of a 15-acre field at Eganville July 28, and traces in two 5-acre fields at Renfrew and garden plots elsewhere on July 30. Weather was favorable for blight last week, but has been largely dry since. -- D. B. O. Savile, Canada Department of Agriculture, Central Experimental Farm, Ottawa, Ontario, August 1.

Late blight was observed August 5 at Goodwood in Ontario County by S. E. Goodin. Conditions appear favourable for blight development. Growers have been warned to begin their spray program if they have not already done so. -- August 6.

Late blight was reported on tomatoes in Durham County, and at Bloomfield, an important canning area, in Prince Edward County by G. H. Berkeley on August 7. Late blight was also reported on potatoes in Wellington County in the same report. -- August 8.

Late blight was found in Middlesex County, August 1 and near Perth in Lanark County on August 7. Late blight is apparently becoming quite widely spread in Ontario. -- I. L. Conners, Canada Department of Agriculture, Central Experiment Farm, Ottawa, Ontario, August 9.

LATE BLIGHT IN MASSACHUSETTS: Potato -- The first report of late blight in a field of potatoes was sent me by County Agent Charles Harris, Jr., who observed it in an unsprayed field in Bristol County on July 18. None was found by him in sprayed fields, nor observed by me in potato fields in the Connecticut Valley during the same week. The only previous report of potato late blight this year in Massachusetts involved the observation on cull pile plants June 12. -- July 21.

I verified today late blight on potatoes reported by county agent of Hampshire County on August 1. This is the second case of blight in a potato field this year (the first one observed in Bristol County on July 18.) Days have been warm and dry but the nights cool and dewy. -- August 4.

Tomato -- First report of late blight of tomatoes made by county agent Vaughan in Worcester County on July 23. Heavy infection of both leaves and fruits in home garden. Weather too hot and dry until this week for widespread development.-- Telegram, July 24, O. C. Boyd, Massachusetts State College, Amherst.

LATE BLIGHT IN CONNECTICUT: This is to report that late blight on potatoes was found in Connecticut, in the vicinity of New Haven on July 29. It is very widely scattered in two unsprayed fields.

Despite a terrific popular pressure, we have not seen any blight on tomato. Neither has any been sent in by correspondence.

Weather was not favorable to blight until July 21. It is almost certain that the July 29 infection began during the infection period of July 21. -- July 31.

Late blight of tomato has now appeared in a local garden on the shore of Long Island Sound. We have had additional late blight weather over the weekend. -- James G. Horsfall, Connecticut Agricultural Experiment Station, New Haven. August 11.

TOMATO AND POTATO LATE BLIGHT IN RHODE ISLAND: In the period since July 21 when potato late blight was first detected in Rhode Island, the disease has progressed vigorously in unprotected fields. One unsprayed field was 90 percent defoliated by blight by July 28, and the remainder of the foliage contained active blight lesions. Nearby fields sprayed with Bordeaux mixture 8-4-100 or 10-5-100 showed only a trace of blight. Several potato fields that are being dusted with Neutral copper are showing 20 to 30 percent blight.

Several light infections of late blight on tomatoes have also been reported to us from various parts of the State -- John B. Rowell, Rhode Island State College, Kingston. July 30.

LATE BLIGHT IN NEW YORK: Dr. W. T. Schroeder of Geneva informs me that he found late blight on tomatoes in Wayne, Monroe, and Livingston Counties. -- July 28.

Reports of potato late blight on tomatoes have come in over the weekend from Suffolk, Yates, and Cayuga Counties. The blight is present on potatoes in at least initial stages in most counties of the State. One potato field, rather severely affected, was found by Dr. F. M. Blodgett, August 1, west of Homer, New York, on the county line between Cortland and Cayuga Counties. -- August 4.

Specimens of late blight on potato and tomato continue to arrive at the office. These, with reports not accompanied by authentic material, represent nearly every county in the State.

Tomatoes are becoming infected rather generally in the vicinity of Ithaca (Tompkins County). The disease has also been sent on tomatoes from Nassau County. -- Charles Chupp, Cornell University, Ithaca. August 11.

TOMATO LATE BLIGHT IN NEW JERSEY: Tomato blight has become widely scattered in the central part of the State and may be expected to cause considerable losses in unprotected fields if high humidity and cool nights continue. Most growers have already applied several applications of either sprays or dusts for blight control. If weather conditions should continue favorable for blight development, heavy losses may occur if fungicides are omitted from this time on.-- C. M. Haenseler, New Jersey Agricultural Experiment Station, New Brunswick. July 26.

LATE BLIGHT IN PENNSYLVANIA: Late blight increased slightly during the week preceding July 28. On July 25 it was found in two tomato fields in Lycoming County. During the week it was found on potatoes in four additional counties: Centre, Lycoming, Tioga, and Sullivan.

By August 2 rapid increase on both hosts took place. The disease had been found on tomatoes in 16 counties: Adams, Bedford, Blair,

Chester, Columbia, Cumberland, Dauphin, Franklin, Fayette, Juniata, Lancaster, Lycoming, Lebanon, Luzerne, Mifflin, and York. There was usually only a small amount in the average field, but a few fields have been found in which most of the tomatoes are infected.

On potatoes, late blight had been found in 19 counties up to August 2. Probably a careful examination would have shown its presence in nearly all. The amount of blight in potato fields varied from light to severe.

During the week preceding August 9 late blight increased slightly on tomatoes and potatoes.

On tomatoes it had been found in 23 counties and could probably be found in nearly every county in the State if a careful examination were made.

Dr. O. D. Burke reported that late blight on potatoes was present in most counties of the State. In a number of counties it was causing serious loss where the potatoes are not properly sprayed.--R. S. Kirby, Pennsylvania State College, State College, July 2, August 2, August 9.

LATE BLIGHT STATEWIDE IN DELAWARE: We had been checking on the trouble and had found no further cases of blight, from the date of the original report, until one field was found a few miles north of Dover, Kent County. This field was found by J. R. Townsend of Libby, McNeil & Libby Company, on Tuesday, July 22. County Agent Tarbell and myself, in company with Townsend, visited this area on July 23. We found three untreated fields that had a high incidence of late blight. Practically every plant showed infection on three to four leaves. Sporulation was heavy; even at 3 o'clock in the afternoon the fungus was fruiting on both top and bottom of the lesions.

On July 23, for the first time, we found secondary spread of late blight in the original field at Rising Sun.

The weather since July 18 had been ideal for late blight, cool and wet.

On July 31, I visited tomato fields all over the State and found late blight to be state-wide in distribution. In the lower end of the State, Sussex County, initial leaf infection was found on tomatoes for the first time. In Kent County, where blight was reported previously many fields showed both leaf and fruit infection. In fact, some untreated fields in Kent County showed as high as 25 percent fruit infection. In New Castle County, northern part of the State, leaf infection was also found.

Every untreated field that I visited in the State showed some late

blight infection. In treated fields, either sprayed or dusted, either no blight was found or only a few scattered lesions were present.

In Sussex County, it was interesting to note that the infection appeared on the south side of the plants. As our prevailing winds in Delaware during the summer are southerly, it looks as though the spores blew in from the areas to the south.

It was noted during the course of this survey that blight was more severe in untreated fields where both water and air drainage was poor. It was also worse in fields with closely spaced plants.

As our weather for the past week or so has been hot and dry, it looks as though the tomato strain can develop at a higher temperature than the potato strain. Interestingly, late blight has been found only in one potato field. In this field the infection is light and scattered.

We are anticipating damage to our untreated fields of tomatoes. -- J. W. Heuberger, University of Delaware, Newark. July 25, August 4.

LATE BLIGHT IN MARYLAND: On July 21, late blight was found in one end of a tomato field near Westminster in Carroll County, northern Maryland. Infected volunteer potato plants were found in a sweetcorn patch across the road from the tomato field. No blight was found in eleven other tomato fields visited in the same vicinity. On July 23 late blight was reported on tomatoes in several home gardens in the Westminster area. These may represent secondary infection.

On July 22 late blight of potatoes was found in a field near Powellsville, Wicomico County, on the Eastern Shore. There were also unconfirmed reports of late blight on tomatoes at other localities in Wicomico County and also in Somerset County. By July 24 late blight was known to occur in four localities on the Eastern Shore and in three in western Maryland. With one exception, all of the tomato plantings in which late blight has been found have been near potatoes.

In general, tomato plants had become so large that spraying or dusting with ground equipment would result in considerable injury to the plant. Many growers were using airplanes for the application of fungicides. Weather conditions during the week preceding July 24 were favorable for the development and spread of late blight.

On July 24 J. C. Stark found late blight in seven tomato fields near Smithsburg, in Washington County, western Maryland. Infection in these fields was widespread and severe. It was estimated that 10 percent of the foliage and 10 percent of the fruits were infected. These fields had not been sprayed or dusted before the appearance of the disease. Very late infection was also found on the foliage of the late blight resistant selection C.r.W. 104-5 in experimental plots in the same area.

On July 28 late blight was found on fruit and foliage of tomatoes in one field near Edgewood in Harford County.

Surveys and examinations of numerous specimens during the week ending July 31 failed to reveal any further outbreak of late blight on the Eastern Shore, in southern Maryland, or in the Patapsco neck section in southern Baltimore County.

On July 31 late blight on tomatoes was observed in home gardens in Mt. Airy, Carroll County, and at Long Green in Baltimore County.

On August 1, late blight was found on fruits and foliage of tomatoes near Keedysville in Washington County. An estimated 20 percent of the fruits were infected in one field. These plantings had not been sprayed or dusted.

Further surveys of tomato plantings in Carroll County were made on August 2. In the end of the field where late blight was first observed on July 21 and which was dusted with a fixed copper, by hand, the day the infection was discovered no active lesions could be found. In the remainder of that field, dusted by helicopter a few days later, only a trace of infection on the foliage was observed on August 2. A number of other fields in the same area showed serious foliage and fruit infection with heavy sporulation on leaf lesions at eleven o'clock in the morning. These fields had been dusted regularly all season as long as ground equipment could be used without extensive damage to the vines, but a week's delay in obtaining a helicopter had left the plants unprotected during the critical period following July 21 and had apparently permitted the disease to become established. Coverage obtained with the helicopter appeared to be very good. Roadways have now been made through the fields and ground equipment is again in use. (A report of August 6 indicates that this treatment is bringing the blight under control.) In another field planted in wider rows so that there was no stoppage of treatment with the duster only an occasional foliage lesion could be found.

On August 5 blight on both fruits and foliage was found near Chestertown and near Still Pond in Kent County. This is the first late blight found on the upper Eastern Shore of Maryland.

On August 5 a survey of tomato fields in Worcester County was made. Late blight is widespread in untreated tomato fields in most of that county except for a narrow fringe along the coast. Heavy fogs and dews with south easterly winds have been prevalent. Severity of infection within the county appears to be closely correlated with local temperature and moisture conditions. In some fields fruit infection is as high as 75 percent but in general it would range between a trace and 30 percent. Much of the infected acreage has been sprayed or dusted once since the disease appeared. A few fields are beyond hope of saving

with fungicides, but in most of them continued application of sprays or dusts should reduce losses materially. In one large field, which has been sprayed 3 times with Dithane D-14-zinc sulfate-lime, no blight could be found. In an unsprayed portion of the same field late blight was found on leaves and fruits. Appreciable losses in that county are expected.

No late blight was found in representative tomato fields in Talbot and Dorchester Counties when they were inspected on July 31 nor in a number of fields visited in the southern half of Caroline County on August 4 and 5. No late blight has been observed or reported in southern Maryland west of Chesapeake Bay and south of Washington, D. C.

So far as we are aware no serious outbreak of late blight has appeared in any tomato field in Maryland which has been sprayed or dusted properly. -- Carroll E. Cox, University of Maryland, College Park. July 24, August 1, August 6.

TOMATO LATE BLIGHT IN THE VICINITY OF WASHINGTON, D. C.: G. H. Coons brought in specimens of late blight affecting tomato foliage and fruit collected August 4 at the National Recreation Center gardens in Bethesda, Montgomery County, Maryland. These plants were not sprayed until after the blight appeared. Apparently, in gardens close by vines sprayed with Bordeaux or with Dithane 14 are protected.

Late blight was found to be sporulating abundantly on foliage by A. C. Foster August 5 in his tomato plots on the Plant Industry Station at Beltsville, in Prince Georges County. -- August 5.

PROGRESS OF LATE BLIGHT IN EASTERN VIRGINIA: Specimens of tomato fruit affected with late blight were received from two plantings in Princess Anne County on July 17 and 18. In one case the blight was occurring in a home garden and the grower stated that the tomatoes were planted right next to potatoes. The potatoes apparently were affected with late blight. The other specimens came from a quarter-acre planting and the grower stated that there were no potatoes nearby. Both plantings were on low wet land where there would be an abundance of water and fogs at the least change in temperature.

No late blight has been found on commercial plantings of tomatoes on the Eastern Shore or the Norfolk side. Practically all potatoes have been harvested on the Norfolk side and most of the potatoes on the lower half of the Eastern Shore will have been dug by the end of this week. Therefore, there is little chance of a build up of late blight inoculum on potatoes. -- July 21.

Late blight was reported from the vicinity of Temperanceville in Accomac County on the Eastern Shore on Friday, July 25. A survey was made of the blight situation on the Eastern Shore on July 29 at which

time severe damage from blight was found in many fields from slightly south of Nelsonia to a little north of Temperanceville. Blight disappeared rapidly south of Nelsonia andwas much less severe north of Temperanceville. No blight has been found in the lower half of Accomac County or in Northampton County. A trace of blight was found in many fields in the vicinity of Norfolk on Monday, July 28.

The disease is too far advanced for control by spray in many fields in the Nelsonia-Temperanceville area, but much of the damage can be checked by prompt spraying and dusting in the other northern Accomac fields. Dusting by plane will be the only practical means of applying the fungicide in most of the fields since the plants are already broken over and covering the middles. Some late plantings are still small enough to be dusted or sprayed by ground machines.

Night temperatures have been favorable for blight during the period July 22 to 27. Temperatures in the upper 50's were recorded at Norfolk on some of those nights and somewhat lower temperatures probably occurred in northern Accomac. Fogs and heavy dews also occurred during that period.

Absence of blight in the southern half of Accomac and Northampton County and the slight development in the Norfolk area is correlated with the early harvesting of potatoes as well as the more southern location. Many potato fields are still undug in northern Accomac and blight has been static in them for several weeks.

An interesting angle to the outbreak of blight in northern Accomac is that a considerable number of growers in the Nelsonia-Temperanceville area had sprayed or dusted their tomatoes at the urging of one of the large canning companies. The blight has affected treated and untreated fields and in some cases blight is worse on the sprayed or dusted fields. Growers who were interviewed had made three to five applications, but had ceased about five weeks ago when the plants broke over and made the use of ground machines impractical. The early sprays and dusts were apparently a waste of time and money since they were applied during the period when the weather conditions were unfavorable for blight and no control was obtained.

Spraying or dusting is being recommended for northern Accomac and the Norfolk area immediately and for the rest of the Eastern Shore beginning next week (August 4). Hot weather is being experienced today and is expected to continue for several days but cool weather is predicted for next week. The present hot weather should check the blight temporarily and give the growers an opportunity to start spraying or dusting.-- July 30.

No late blight was found in a survey of commercial tomato plantings in the counties on the west side of Chesapeake Bay (Westmoreland, North-

umberland, Richmond, Lancaster, Middlesex, Mathews and Gloucester) on August 1. A particular search was made in the vicinity of Reedville since blight caused considerable damage there in 1946 and it is directly across the bay from the Nelsonia-Temperanceville area on the Eastern Shore where blight is epiphytotic. It is of interest to note that practically no potatoes are grown in these counties. This corresponds with the situation in Northampton and lower Accomac Counties where the potatoes were harvested before any blight developed and is in contrast with northern Accomac County where potatoes are still being harvested and late blight has developed on tomatoes.

A survey of the Eastern Shore on August 6 showed that late blight had been checked by the hot weather during the period from July 28 to August 2. Some fields that showed severe foliage infection on July 29 were being picked and were showing only about 5 percent fruit infection. However, fruit infection was general and the loss heavy in the 6-mile wide area between Nelsonia and Temperanceville. Traces of blight were found as far south as Onley, but no important damage had occurred south of Nelsonia. No blight was found in Accomac county south of Onley and none was found in Northampton County.

The growers are not inclined to spray or dust at this time, in spite of the presence of late blight in some areas, because of the falling market and the advanced state of the crop in most fields. It is very doubtful if fungicidal applications would be profitable even if growers were willing to spray or dust.

In addition to late blight fruit rot, which is found only in a few limited areas, the only fruit diseases found in Eastern Virginia this year are buckeye rot and blossom end rot. No anthracnose, bacterial spot, nailhead rust or bacterial canker have been observed. Although some defoliation has been caused by early blight and Septoria leaf spot, the yield has not been reduced by these diseases and ripening of the fruit has been hastened. Tomatoes with heavy foliage and unaffected by these diseases are extremely slow about ripening this year. Therefore, spraying would not have been profitable from the standpoint of the control of diseases other than late blight. -- Harold T. Cook, Virginia Truck Experiment Station, Norfolk. August 8.

TOMATO AND POTATO LATE BLIGHT IN WESTERN VIRGINIA: This is to report that I found late blight on tomatoes and potatoes in Roanoke and Botetourt Counties today. In one tomato field typical late blight lesions were observed on the fruit. In all cases of late blight, tomatoes were grown adjacent to Irish potatoes.

The worst infection on tomatoes was found on the road between U. S. 11 and Bonsack. -- July 22.

Late blight was found on tomato fruits in Bedford County today. One

half of the fruits in one small garden were already infected.

Weather conditions have been ideal for the past three weeks; cool nights and warm days with frequent showers and high humidity. -- S. B. Fenne, Virginia Extension Service, Blacksburg. July 23.

TOMATO LATE BLIGHT IN NORTHWESTERN VIRGINIA: I wish to report the first observed development of the disease in the Winchester region this year. Rather heavy infection was observed in one commercial planting on Saturday, August 2. The fungus was fruiting and I would judge had been apparent for a week. Most of the commercial plantings have been sprayed and appear free of blight; this particular block was unsprayed. -- Reported by A. B. Groves, Virginia Agricultural Experiment Station, Winchester. August 4.

ACTIVE TOMATO LATE BLIGHT IN SOUTH CAROLINA: The regular tomato shipping season in coastal South Carolina is over. Late blight was present along the coast in Charleston and Beaufort Counties, but caused negligible damage to the crop. No reports of the occurrence of blight were received from any of the inland counties and a thorough survey in Dillon County failed to reveal even a trace of the disease.

Late blight lesions were found on July 21 on a summer crop of tomatoes at the Truck Experiment Station at Charleston. The lesions were widely scattered, but the fungus was fruiting vigorously and some spread is probably occurring in spite of the warm weather. -- William M. Epps, South Carolina Truck Experiment Station, Charleston. July 22.

TOMATO LATE BLIGHT IN KENTUCKY: Specimens of late blight on tomato have been received from Fayette County, July 21; Casey County, July 22; and Campbell County, July 23. This is in addition to the earlier reports from Whitley, Lee, and Lawrence Counties, the first two verified by specimens. -- W. D. Valleau, Kentucky Agricultural Experiment Station, Lexington.

THE LATE BLIGHT SITUATION IN INDIANA: Late blight was identified in tomato fruits from a canning field in southweatern Indiana on July 14. Infection was limited in the field and making little progress. An undoubted report of limited tomato late blight in Hendricks County has just been received. No late blight has been found in several hundred acres of tomatoes examined since July 8 in Knox, Jackson, Johnson, Marion, Howard, Grant, Tipton and Clinton Counties. Serious or general late blight infection on Indiana tomatoes appears unlikely in the next three weeks because of insufficient build-up to date. All fields set with Georgia-grown plants were originally free of the disease, likewise all direct seeded fields and fields set with Indiana-grown plants.

We suspect traces of the disease shipped in June on tomato plants from the Lower Mississippi Valley area of western Tennessee, western

Kentucky, and southern Illinois. But, because of the late setting, foliage development has been too limited as yet in fields set with such plants to permit much if any late blight build-up and spread to uninfected acreage.

Weather over most of Indiana from about June 10 to July 10 was unfavorable for late blight (mostly too dry, though abnormally cool), but very favorable from July 10 to 21. -- July 22.

Since July 22, we have received specimens and unquestioned reports of tomato late blight from Dubois, Jefferson, Putnam, Hendricks, Montgomery and Huntington Counties.

This indicates that the disease is generally present in most parts of the State, more particularly in the southern and central parts, in especially favored locations. These locations include some early fields with very heavy foliage, along the north side of woods and brushy fence rows, low-lying areas where fogs prevail, and in some early home garden plantings, particularly where shaded. Where recent rains have occurred, infection may be more general than this.

It still does not appear that blight development can be as severe on tomatoes in the next two weeks as during the similar period in 1945. Unfortunately, temperatures have persisted below normal. This promotes the disease, particularly in those areas where rains have been sufficient to keep pastures and lawns green and luxuriant.

Limited search last week revealed no late blight on muck potatoes in northern Indiana where it was found before that time last year. It very likely is present to some extent where spraying has not been too thorough, or over high water tables and near lakes. Late potatoes on upland soils may be severely damaged by the disease in late September unless adequately sprayed. The danger is mainly that of an excessive amount of tuber infection. -- July 30. R. W. Samson, Purdue University, Agricultural Experiment Station, Lafayette.

TOMATO LATE BLIGHT IN ILLINOIS: Mr. Boewe of State Natural History Survey reports July 30 late blight on tomatoes near Dongola, Union County. Prevalence nearly 100 percent but only on foliage; recent infection on some leaves. Planting on bottom ground, very cool at night with recent heavy dews. I found no late blight on tomatoes and potatoes in East Central and Northeast Illinois this week. -- M. B. Linn, University of Illinois, Urbana. Telegram, July 31.

POTATO LATE BLIGHT IN MICHIGAN: First report of potato late blight from Michigan seen by Prof. Henry C. Moore in Upper Peninsula Counties of Luce (July 23), Schoolcraft, Delta, and Marquette. Isolated plants affected in numerous fields. Abundant in section in some low spots. Prof. Ernest Wheeler reports potato late blight from his irrigated plots at Pinckney (Lower Peninsula) on July 28. -- L. Carl Knorr, Michigan State College, East Lansing. Telegram August 4.

POTATO LATE BLIGHT IN MINNESOTA: Mr. R. C. Rose reports that on July 23 blight was found causing severe damage in unprotected fields in the Hollandale peat area, where he first found infection on July 9. In such fields the disease had spread from infection centers, and in these spots the plants were defoliated. Only traces of infection were found in sprayed fields, but the disease was present in every field examined. No blight has been found yet in other parts of the State. -- Carl J. Eide, University of Minnesota, University Farm, St. Paul. July 25.

LATE BLIGHT IN IOWA: Late blight was observed on Cobblers and Sebagos in north central Iowa July 24. It is now prevalent on muck land potatoes in north-central Iowa. Apparently there have been enough heavy dews that the fungus has persisted in spite of the dry weather of the past month. Until the past few days, temperatures have not been too high. It is reasonable to assume that there is enough inoculum for a heavy outbreak in northern Iowa if weather becomes favorable.

So far we have seen no specimen of late blight on tomatoes in Iowa. Current weather is not favorable for wide and abundant spread. Except perhaps on garden tomatoes in north-central Iowa, the prospect of an outbreak in the immediate future seems somewhat remote. Apparently the transplants were free this year. -- W. F. Buchholtz, Iowa State College, Ames. July 29.

TEXAS ROOT ROT IN LOUISIANA

C. W. Edgerton

Specimens of cotton plants affected with Texas root rot (Phymatotrichum omnivorum) were collected by Dr. M. B. Sturgis of the Agronomy Department, Louisiana State University on August 12, 1947, in Caddo Parish, Louisiana, in the extreme northwest corner of the State near the Arkansas line. The disease was occurring in small areas. This is the first report of Texas root rot in Louisiana.

LOUISIANA AGRICULTURAL EXPERIMENT STATION
BATON ROUGE

CHECK LIST REVISION

Freeman Weiss

SOLANUM (SOLANACEAE)

SOLANUM spp. (ornamental). S. CAPSICASTRUM Link, FALSE JERUSALEM-CHERRY (1), S. DULCAMARA L., BITTER NIGHTSHADE (BITTERSWEET) (2), S. INTEGRIFOLIUM Poir., SCARLET EGGPLANT (3), S. PSEUDO-CAPSICUM L., JERUSALEM-CHERRY (4). Old World shrubs (1,4) or vine (2), and annual herb of Africa (3), grown for ornament; (2), locally naturalized. Many other spp. are occasionally cultivated in warm regions.

Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn., crown gall. Conn. (2)
Alternaria solani (Ell. & G.Martin) Sor., leaf spot.
Ascochyta lycopersici Brun., leaf spot. N.Y., Ohio (2)
Cercospora dulcamarae (Pk.) Ell. & Ev., leaf spot. Mich., N.Y., Wis. (2)
Cuscuta gronovii Willd., dodder. N.Y. (2)
Heterodera marioni (Cornu) Goodey, root knot. Md. (1); Calif., Ore. (4)
Mycosphaerella solani (Ell. & Ev.) Wr., leaf spot. Ohio (2)
Phyllosticta pseudocapsici Roum., leaf spot. La. (4)
Stemphylium solani Weber, gray leaf spot. Fla. (4)
Verticillium albo-atrum Reinke & Berth., wilt. N.Y. (3)

Mosaic -- unidentified (probably tobacco mosaic) virus. Iowa (2), Va. (4)
Tip blight -- virus (Lethum australiense var. lethale Holmes, Lycopersicon virus 3 K.M.Sm.). Ore. (1)

SOLANUM spp. (miscellaneous native plants, mostly weeds). S. CAROLINENSE L., CAROLINA HORSENETTLE (1), S. ELAEAGNIFOLIUM Cav., SILVERLEAF NIGHTSHADE (2), S. NIGRUM L., including var. VILLOSUM Mill., BLACK N. (3); S. ROSTRATUM Dunal, BEAKED N., BUFFALO BUR (4), S. TRIFLORUM Nutt., CUTLEAF N. (5). Perennial (1,2) or annual (3,4,5) herbs of prairies, waste ground, and (especially 1,2,3) weeds in cultivated ground. All furnish food for wildlife; garden forms of S. nigrum var. guineense L. are grown for edible fruit.

Alternaria solani (Ell. & G.Martin) Sor., early blight, leaf spot. Tex., Va., Wis. (1); Fla., Tex., W.Va. (3); Kans., Tex. (4)
Ascochyta lycopersici Brun., leaf spot. Del. (1)
Bacterium solanacearum E.F.Sm., bacterial wilt. P.R. (3)
Cercospora atromarginalis Atk., leaf spot. Tex. (1,2); Ala., Fla.,

Solanum cont.

Ga., Tex., P.R. (3). Also reported under the probable synonyms C. rigospora Atk., C. tosensis P.Henn., and ? C. nigri Tharp.

C. carolinensis Tharp, leaf spot. Tex. (1)

C. solani Thuem. (C. nigrescens Wint.). La., Tex. (3)

Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Ore. (3)

D. phyllobius (Thorne) Filip., leaf nematode. Tex. (2)

Entyloma australe Speg., white smut. Iowa, Kans. (3); Mont., N.Dak. (5)

Erysiphe cichoracearum DC., powdery mildew. Ala., Md., N.Car., Pa., Tex. (1); Calif. (3)

Heterodera marioni (Cornu) Goodey, root knot. Calif., Md., Nev., Ore. (3); ? Fla., ? S.Car. (1,3,4)

H. schachtii A. Schm., root nematode. Utah (3)

Macrophoma subconica Ell. & Ev., leaf spot. La., Tex. (3)

Microsphaera sp., powdery mildew. Ill. (1)

Phoma terrestris Hansen, stem canker. Okla. (1)

Phyllosticta dulcamarae Sacc., leaf spot. Ind., Mo., Tex. (1)

P. solani Ell. & G.Martin, leaf spot. Ky., Ohio (1)

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3,4)

Phytophthora infestans (Mont.) DBy., late blight. Ore. (3)

Pseudomonas tabacum (Wolf & Foster) Stapp, wildfire. Wis. (3)

Puccinia substriata Ell. & Barth. (Aecidium tubulosum Pat. & Gaill.) O.I, rust. Tex. (2)

Rhizoctonia crocorum DC. ex Fr., violet root rot. Tex. (2)

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Tex. (2)

Sclerotium rolfsii Sacc., southern blight. Fla. Tex. (3)

Septoria lycopersici Speg., leaf spot. Del., Md., Tex. Va. (1)

S. solanina Speg. Calif. (3)

Verticillium albo-atrum Reinke & Berth., wilt. Md., N.J. (1), N.Y. (1,2,4)

Curly top -- virus (Chlorogenus eutettícola Holmes, Beta virus 1 K.M.Sm.). Tex. (1,3,4)

Leafroll -- virus (Corium solani Holmes, Solanum virus 14 K.M.Sm.) Ore., Wash. (3)

Mosaic -- virus(es). In part, tobacco mosaic virus (Marmor tabaci Holmes, Nicotiana virus 1 K.M.Sm.) reported on (1) in Fla., Ind., Ky.; on (3) in Iowa and Ohio; in part unidentified in Fla. (1,3); Tex. (2); and Ind., Ohio, Utah, Wash. (3). The cucumber mosaic and tobacco etch viruses cause systemic infection of (1) and (3), and the potato mottle and veinbanding viruses of (?), by artificial inoculation.

Ring spot -- virus (Marmor annularium McK., Nicotiana virus 12 K.M. Sm.). Ky., Va. (1)

SOLANUM MELONGENA L., EGGPLANT (1). Perennial shrub of southern Asia from which the cultivated eggplant (var. ESCULENTUM Nees) is

Solanum cont.

derived; commonly grown as an annual in gardens throughout the U.S. except the far North; commercial culture chiefly in Fla., N.J., La. and Tex. S. TORVUM Sw., BERENJENA CIMARRONA (2) of the Caribbean region, on which the cultivated plant is sometimes grafted.

Actinomyces sp., on roots. Mich. (1)

Alternaria solani (Ell. & G.Martin) Sor., early blight, leaf spot (chiefly in seedbeds), ?dry rot of fruit. Occasional, N.Y. to Fla., La. and Wis. (1). The fruit rot phase is perhaps caused by Alternaria tenuis Nees ex Cda., commonly occurring as a secondary invader of spotted leaves.

Ascochyta lycopersici Brun. (Diplodina lycopersici Hollo's), leaf spot. Del., Ill., Ind., N.Y. (1). In Europe said to be the conidial stage of Didymella lycopersici Kleb., the ascigerous stage not recorded here. A. solani-nigri Died. is also reported in N.Y. (1)

Bacterium solanacearum E.F.Sm., bacterial wilt. General in the South, Va. to Fla. and Tex., Hawaii and P.R.; occasional northward to Mass. and Ind. (1); P.R. (2).

Botrytis cinerea Pers. ex Fr., gray-mold rot of fruit. Calif., Conn., Mass., N.J., Va. and Wash. Occasionally on stems (? secondary) in fields.

Cercospora melongenae Welles (? C. capsici Heald & Wolf, ?C. physalidis Ell.). leaf spot. Calif., Hawaii

C. trichophila F. L. Stevens. P.R. (2)

Cladosporium fulvum Cke., leaf mold. P.R. (1,2)

Colletotrichum spp., anthracnose. Occasional, N.Y. to Fla. and Tex., Okla., Utah, P.R. Sometimes identified as C. atramentarium (Berk. & Br.) Taub. (C. solanicolum O'Gara) or C. nigrum Ell. & Hals.; probably includes saprophytic forms and also Gloeosporium melongenae (q.v.)

C. truncatum (Schw.) Andrus & Moore, fruit rot. Miss.

Cuscuta spp., dodder. Kans., N.J., Pa., Va. C. epithymum Murr. Va.

Diaporthe arctii (Lasch) Nits., on stems. Ga.

D. vexans Gratz. See Phomopsis vexans.

Diplodia natalensis Pole-Evans, fruit spot. Fla., P.R.

Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. N.J.

Erysiphe cichoracearum DC., powdery mildew. P.R. (2)

Fusarium sp., wilt (? secondary). Reported occasionally in all eggplant-growing areas, especially in the Middle Atlantic and Southern States, but specific identification and proof of pathogenesis lacking. Hypomyces ipomoeae (Hals.) Wr., associated with the conidial stage F. solani (Mart.) Appel & Wr., is sometimes found on dead stems.

Gloeosporium melongenae Ell. & Halst., anthracnose, ripe rot. Occasional, N.J. to Fla., Tex., and Iowa. Probably a conidial race of Glomerella cingulata (Ston.) Spauld. & Schrenk but not

Solanum cont.

definitely connected therewith. See also Colletotrichum.

Gnomonia sp., on dead stems. La.

Heterodera marioni (Cornu) Goodey, root knot. General in the Southern States, occasional northward as Pa., Mo., Kans., Nev.; Hawaii

Macrophomina phaseoli (Maub.) Ashby, charcoal rot (of stems). N.J.

Meliola solani F.L.Stevens, black mildew. P.R. (2)

Nectria sp., N. ipomoeae Hals. See Fusarium.

Peronospora tabacina Adam, downy mildew (in seedbeds). S.Car.

Phomopsis vexans (Sacc. & Syd.) Harter, fruit rot, Phomopsis blight. General in fields and markets, especially in the South. This is apparently the Phyllosticta hortorum of American authors, not Speg., also reported as Ascochyta hortorum (Speg.) C.O. Sm., but A. lycopersici Brun. is distinct. The ascigerous stage, Diaporthe vexans Gratz is known only in cultures.

Phyllosticta solani Ell. & G.Martin, leaf spot. La.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Phytophthora infestans (Mont.) DBy., late blight. Fla., N.Y.

P. parasitica Dast. (P. terrestris Sherb.) fruit rot. Fla., Ind., P.R.

Pratylenchus pratensis (De Man) Filip., root nematode. Tex.

Puccinia substriata Ell. & Barth. (O,I), rust. P.R. (2)

Pythium aphanidermatum (Edson) Fitz., cottony leak. Calif., Fla., Tenn. P. acanthicum Drechs. is reported to cause a similar fruit rot in Calif., P. butleri Subr., in P.R., and P. myriotylum Drechs. in Fla.

P. debaryanum Hesse, damping off. Conn., La., N.J., N.Y., P.R.

Rhizoctonia solani Kuehn, damping off, stem rot, fruit rot. General. R. melongena Matz and R. microsclerotia Matz, causing stem rot and wilt in P.R., appear to be forms of R. solani, all referable to Pellicularia filamentosa (Pat.) Rogers in the basidial stage.

Rhizopus stolonifer (Ehr. ex Fr.) Lind, fruit rot. Calif., Ind., Tex.

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Calif., Fla., Ind., La., Cre., Tex.

Sclerotium rolfsii Sacc., Southern blight. Va. to Fla. and Tex; P.R.

Septoria lycopersici Speg., leaf spot. Ind., Md., N.Car., Va., Hawaii.

Stemphylium solani Weber, gray leaf spot. Fla.

Verticillium albo-atrum Reinke & Berth., wilt. General, including the Pacific States. The forms (or closely related spp.) identified as V. dahliae Klebahn are reported in Mass., N.Y. and Wash.; V. lycopersici Pritchard & Porte in Utah; V. ovatum G. H. Berkeley and A. B. Jackson in Mass.

Solanum cont.

Bunchy top -- suspected virus. Tex.

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.). Ore., Tex., Wash.

Mosaic -- virus(es). In part cucumber mosaic virus (Marmor cucumeris Holmes, Cucumis virus 1 K.M.Sm.) reported in Fla.; also unidentified virus, perhaps tobacco mosaic, reported in Ariz., Colo., Conn., Fla., Ind., Iowa, Mass., Mich., N.J., Pa., Tex., Va. The potato calico strain of alfalfa mosaic virus may also cause systemic infection.

Yellows -- unidentified virus related to cucumber mosaic group. Fla., La., Okla., S.Car., Tex., ? Hawaii

SOLANUM TUBEROSUM L., POTATO. Cultigen of prehistoric times originating in the Andean highlands of S. America, introduced into Europe in the 16th century and thence distributed to temperate regions throughout the world. Cultivated in the U.S. in all States, the principal maincrop producing areas being in the Northeastern (Me., N.Y., Pa.), North Central, (Mich., Wis., Minn., N.Dak.), Western (Ida., Colo., Nebr.), and Pacific (Calif., Ore., Wash.) States; the principal early and intermediate crop areas being in the Southern States (S.Car. to Fla., Tex. and Okla.) Middle Atlantic (N.J. to N.Car.), South Central (Tenn. to Kans.), and California.

(Acrostalagmus cinnabarinus Cke.): Verticillium c.

Actinomyces scabies (Thaxt.) Güssow, scab (on tubers, stolons and roots. In the revision of Actinomycetales proposed by Waksman and Henrici the potato scab and related organisms are referred to a new genus, Steptomyces, but specific combinations have not yet been published. Various other Actinomycetes have been reported pathogenic to potatoes, some inducing different types of scab and some being associated with superficial russeting of tubers (soil scurf) but present taxonomic information does not permit assigning specific names.

Alternaria solani (Ell. & G.Martin) Sor., early blight. General. Tuber rot caused by this fungus is also reported in Ariz., Ark., Colo., Fla., Me., Mich., Minn., N.Car., N.Dak., and Wis.

Armillaria mellea Vahl ex Fr., mushroom root rot. Calif., Mich., Ore., Wash., Wis., Wyo. Tuber rot, Fla.

Ascochyta lycopersici Brun., leaf spot. Ore., Alaska.

Aspergillus niger v. Tiegh., tuber rot (secondary). Occasional in markets.

Bacillus mesentericus Trev., slimy soft rot (secondary or sometimes primary). Cosmopolitan.

Bacterium solanacearum E.F.Sm., bacterial wilt, brown rot. Chiefly in the South from Md. to Fla. and Ariz., occasionally reported in the North and West (Mass., Ohio, Mich., Ill., Nebr., Ida., etc.) but some of these reports have probably confused this

Solanum cont.

disease with bacterial ring rot (see Corynebacterium).

Botrytis cinerea Pers. ex Fr., gray-mold rot (usually of tubers in storage, sometimes in the field), also shoot blight and stem-girdle. Conn., Ida., Me., Ohio, Alaska.

Cercospora concors (Casp.) Sacc., leaf blotch. Ga., Ind., Mich., N.Y., Vt., W.Va.

C. solani Thuem. (C. solanicola Atk.). Ala., Tex.

Clonostachys araucaria Cda. var. rosea Preuss, secondary tuber rot. Occasional in storage and markets.

Colletotrichum atramentarium (Berk. & Br.) Taub. (C. solanicolum O'Gara). On stems and stolons, "black dot disease", "anthracnose". Reported in N.J., N.Y., Ohio, Okla., Ore., Pa., Tex., Utah, Va., W.Va. but probably general, following wilt and various stem lesions.

Corticium solani (Prill. & Del.) Bourd. & Galz. See Pellicularia filamentosa and Rhizoctonia solani.

Corynebacterium sepedonicum (Spieck. & Kotth.) Burk. & Skapt., bacterial ring rot. General, reported from all States except a few in the South and West.

Cuscuta spp., dodder. Del., Nebr., N.J., Wash. C. arvensis, Wash.

Cylindrocarpon spp., on necrotic tubers and roots. C. magnusianum Wr., Ida., N.Y. C. radicicola Wr. Ore.

Ditylenchus destructor Thorne, tuber necrosis. Ida.

Erwinia aroideae (Town.) Holland and E. carotovora (L.R.Jones) Holland, slimy soft rot, Cosmopolitan in transit and markets, often in the field following sunscald, frost, wounding, and fungus rots; also causing seedpiece rot under conditions unfavorable for germination.

E. phytophthora (Appel) Bergey et al., blackleg. General, especially in the North, less frequent in the South. Typically on stems, also causing seedpiece and tuber rot; by some authors regarded as only a physiological race of E. carotovora; likewise Erwinia atroseptica (v. Hall) Bergey et al. and E. solanisapra (Harrison) Holland.

Erysiphe cichoracearum DC., powdery mildew. Ky., ?N.J. Perithecial stage in Ky., only conidial stage in N.J.

Fusarium spp. (a) wilt, stem-end rot. Chiefly F. oxysporum Schecht. emend Snyder & Hansen--sometimes designated more precisely as F. euoxysporum Wr. (F. oxysporum f. 1 Wr., or f. tuberosi Snyder & Hansen)--general, but more frequent in the East and South; F. solani (Mart.) App. & Wr. var. eumartii (Carpenter) Wr., reported from N.Y. to Md., Okla., Nebr. and Wis., also Colo., Ida., Mont., Wyo.; and F. avenaceum (Fr.) Sacc., reported in Me., Minn., N.Y., Wis. (probably general). F. solani f. radicicola (Wr.) Snyder & Hansen (F. javanicum Koord. var. radicicola Wr.) causes "jelly" end-rot in the Western States, especially Ida. to Colo., Calif. and Wash.; also a black rot of tubers in the East and South, N.Y. to Fla. and Nebr.

Solanum cont.

(b) Dry rot (in storage and markets): Chiefly F. caeruleum (Lib.) Sacc., in northern potato areas from Me. to Md., Mo. and Wash.; F. sambucinum Fckl. f. 6 Wr. (F. discolor App. & Wr. var. sulphureum (Schlecht.) App. & Wr.)--general in the Northern and Central States to Tex. and Ida.; F. trichothecioides Wr., in the Central and Western States from Ohio and Mich. to Mo., Ariz., Calif. and Wash.; sometimes causes field rot and wilt.

(c) Miscellaneous tuber and seedpiece rots and vascular discoloration: F. angustum Sherb., N.Y.; F. bulbigenum Cke. & Mass., Ala., Calif.; F. conglutinans Wr., Me.; F. orthoceras App. & Wr. and var. longius (Sherb.) Wr., widespread; F. oxysporum var. aurantiacum (Lk.) Wr. La., N.Y.; F. oxysporum f. batatas (Wr.) Snyder & Hansen, Miss.; F. redolens Wr., N.Y.; F. vasinfectum (Atk.) var. lutulatum (Sherb.) Wr., N.Y. (all forms of F. oxysporum Schlecht. in the sense of Snyder & Hansen). F. anguioides Sherb., Mont., N.Y.; F. arthrosporioides Sherb., Mont., N.Y.; F. culmorum (W.G.Sm.) Sacc., widespread; F. equiseti Cda. and var. bullatum (Sherb.) Wr., Iowa, Mont., N.Y.; F. flocciferum Cda., Ida., Mont., N.Y.; F. sambucinum Fckl., La., Mont., N.Y.; F. scirpi Lambotte & Fautr. and var. acuminatum (Ell. & Ev.) Wr., widespread; (all forms of F. roseum Lk. in the sense of Snyder & Hansen). F. argillaceum (Fr.) Sacc. (? Hypomyces solani Reinke & Berthe.), Ala., La., Me., Md., N.J., N.Y. F. dimerum Penz. and F. merismoides Cda. (? Nectria episphaeria Tode ex Fr.) in Minn. and N.Y. F. moniliforme Sheldon, Calif. F. solani (Mart.) App. & Wr., and F. solani var. martii (App. & Wr.) Wr., cosmopolitan; F. solani var. striatum (Sherb.) Wr., Colo. F. poae (Pk.) Wr. and F. sporotrichioides Sherb. (? F. tricinctum Cda.) in Me. and N.Y.

Gliocladium sp. (? G. solani (Harting) Petch), secondary tuber rot. Tex.

Gloeosporium sp., on stems, ? anthracnose. Ind., Ohio

Heterodera marioni (Cornu) Goodey, root knot. General in the South from Va. to Fla. and Calif.; also Del., Ida., Kans., Nebr., N.Y., Ore., Utah, Wash., Hawaii.

H. rostochiensis Wr., golden nematode (on roots). N.Y. (Long Island)

Hypomyces ipomoeae (Hals.) Wr., on decaying tubers. Md., N.J. Ascigerous stage of ?Fusarium radicicola. H. solani Reinke & Berth., by some authors considered the ascigerous stage of F. argillaceum, by others of F. solani in a broad sense, is reported in cultures but records of natural occurrence on potato plants in this country are lacking.

Macrophomina phaseoli (Maub.) Ashby, charcoal rot. Calif., Ga., Ill., Md., Okla., Tex.

Mycosphaerella solani (Ell. & Ev.) Wr., on necrotic stems and tubers. Me., N.Y. Ascigerous stage of ? Septomyxa affinis.

Nectria spp., on stems or tubers. La., Md., N.J., Va. N. bras-

Solanum cont.

sicae Ell. & Sacc., N.J. (N. ipomoeae Hals.): Hypomyces i. Associated with Fusarium and Verticillium spp. as asicgerous stages.

Neocosmospora vasinfecta E.F.Sm., on tubers. Ala.

Oidium sp. (? O. solani Vanha), powdery mildew. Md., N.J., Pa.

Oospora pustulans Owen & Wakefield, skin spot. Pa., Wash. On imported potato tubers.

Papulaspora coprophila (Zukal) Hotson, on tubers following powdery scab. Me., Pa.

Pellicularia filamentosa (Pat.) Rogers (Rhizoctonia solani Kuehn), black scurf, sprout canker, stem rot, rhizoctonose. General in the sclerotial and mycelial phases, the basidial stage infrequent.

Penicillium sp. (in part P. oxalicum Currie & Thom), blue-mold rot. Occasional in markets, reported in Ida., Ind., N.Y., Va.

Phoma sp., on stems, ? canker. Me. to N.J. and Mich.; Calif. P. dulcamarina Sacc., Ore. P. eupyrena Sacc., N.Y. P. solanicola Prill. & Del., Pa., W.Va.

P. tuberosa Melhus, Rosenbaum & Schultz, tuber rot. Me., Md., Pa.

Phomopsis sp. (? P. vexans (Sacc. & Syd.) Harter), on stems. Tex., ? Ore.

P. tuberivora Güssow & W.R.Foster, stem-end rot. Wash.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Phytophthora drechsleri Tucker, tuber rot. Ida.

P. erythroseptica Pethyb., pink rot, watery rot. Ida., La., Me., Mass., Okla.

P. infestans (Mont.) DBy., late blight. General, commonly in the Northeastern, Middle Atlantic, and North Central States; occasional in the Gulf and Western States, also Hawaii and P.R.

P. parasitica Dastur, tuber rot. Ky., Okla., P.R.

Pratylenchus pratensis (DeMan) Filip., meadow nematode (on roots). Miss., S.Car., Va. Probably P. scribneri Steiner, a segregate from this group, specifically identified in Tenn.

Pythium sp., watery rot, leak. Chiefly P. debaryanum Hesse, reported commonly in the West (Calif., Colo., Ida., Minn., Mont., Nebr., N.Dak., Wash., Wyo.), occasionally in the East and South (Conn., La., Miss., N.J., N.Y.). P. aphanidermatum (Edson) Fitz. and P. ultimum Trow are reported on tubers in Calif.; P. arrhenomanes Drechs. and P. rostratum Butl. on roots in Hawaii.

Ramularia solani Sherb., on necrotic tubers. N.Y.

Rhizoctonia crocorum (Pers.) DC. ex Fr., violet root rot, sometimes on tubers. Mass., Mont., Nebr., N.Y., N.Dak., Okla., Ore., Tex., Wash. Sterile stage of Helicobasidium purpureum Pat.

R. solani Kuehn, black scurf, sprout canker. General. Jelley-end rot, Calif. and Ida. Sterile stage of Pellicularia filamentosa.

Solanum cont.

Rhizopus spp., mush rot, leak. Calif., Ida., Ohio, Tex., Wash. Commonly R. stolonifer (Ehr. ex Fr.) Lind (R. nigricans Ehr.); similar tuber rot may be caused by R. tritici K. Saito.

Sclerotinia sp., stem rot. Fla., Me., S.Car. S. minor Jagger, Calif. S. sclerotiorum (Lib.) DBy., Fla., Mass., Mont., N.Y., Ore., Tex., Wash.

(Sclerotium bataticola Taub.): Macrophoma phaseoli

S. rolfsii Sacc., southern blight. N.Car. to Fla., Ariz., and Okla.; Hawaii, P.R. Sterile stage of Pellicularia rolfsii (Curzi) E. West.

Septomyxa affinis (Sherb.) Wr., on necrotic stems & tubers, ? saprophytic. Me., N.Y.

Spondylocladium atrovirens Harz., silver scurf. General in the Eastern and Central States and Pacific Northwest, less frequent in the South.

Spongospora subterranea (Wallr.) Lagh., powdery scab. Occasional in the North (Me. to Pa., Minn., Wyo. and Wash.); also Ala., Fla., Miss., Okla., S.Car.

Stysanus stemonitis Cda., secondary tuber rot, speck rot, "brown disease". Ida., Ind., Mass., Mich., Nebr., N.Y., Ore.

Synchytrium endobioticum (Schilb.) Perc., wart. Md., Pa., W.Va.

Trichothecium roseum Lk. ex Fr., pink-mold rot. Ida., Minn.

Tylenchus penetrans Cobb, on tubers. Mich.

Vermicularia sp., black dot. See Colletotrichum.

Verticillium albo-atrum Reinke & Berth., wilt, ? dry rot. Chiefly in the Northeastern, Western, and Pacific States; also Ark., Fla., La., Va.

V. cinnabarinum (Cda.) Reinke & Berth., on decaying tubers. Cosmopolitan. Conidial stage of Nectria inventa Pethyb.

Xylaria apiculata Cke., tuber rot. Fla.

VIRUS AND RELATED

Apical leafroll -- unidentified virus related to but not identical with eastern aster yellows; perhaps synonymous with yellow-top. Me., ? Nebr.

Aster yellows, California strain -- virus (Chlorogenus callistephi var. californicus Holmes, Callistephus virus 1A K.M.Sm.) Calif. For eastern aster yellows see Purple-top.

Aucuba mosaic -- virus (Marmor aucuba Holmes, Solanum virus 9 K.M. Sm.). Me., Md. (in experimental stocks, not in commercial potatoes).

Blue-stem. See Purple-top.

Calico -- virus (Marmor medicaginis Holmes var. solani Black& Price, Solanum virus 10 K.M.Sm.). Chiefly in the Western States from Mont. to Colo., Calif. and Wash.; also Iowa, Mich., Nebr., N.Y., N.Dak., Tex.

Solanum cont.

Crinkle, crinkle mosaic -- strain of mild mosaic virus (Marmor solani Holmes, Solanum virus 3 K.M.Sm.), usually with latent virus. General, but less frequent than mottling strain.

Curly dwarf -- virus complex, sometimes equivalent to rugose mosaic (severe mosaic + latent viruses) with which spindle tuber or other viruses may be associated; originally referred in Maine to a virus complex of leaf rolling mosaic, spindle tuber, and latent viruses. See also unmottled curly dwarf.

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.). Calif., N.Mex., Ore., Tex., Wash.

Giant hill. See under Nonparasitic Diseases.

Hair sprout -- in part virus, especially witches'-broom; in part an effect in tubers induced by occurrence of psyllid yellows in the plant. Chiefly in seed tubers of western origin (psyllid yellows type) reported in Calif., Colo., Ida., Kans., Mont., Ore.; probably other types reported occasionally in the East and South (Fla., La., Mich., Minn., N.Y., W.Va., Wis.)

Haywire -- ? virus, unidentified, probably of purple-top or yellow-top group; perhaps in part psyllid yellows. Colo., Ida., Kans., Nebr., Mont., Tex., Wyo., ?La., Miss.

Interveinal mosaic -- in part a strain of latent (mottle) virus, as in Green Mountain var. in Me., also known as potato virus B and Up-to-Date streak virus; in part an unidentified virus, also called super-mild mosaic, occurring in certain varieties in the Northwestern States.

Latent virus. See Mottle.

Leafroll -- virus (Corium solani Holmes, Solanum virus 14 K.M.Sm.) General.

Leafrolling mosaic -- virus (Solanum virus 11 K.M.Sm.) Me., Mont., N.Dak., Ore., Utah, Wis.

Mild mosaic, veinal mosaic -- virus (Marmor solani Holmes, Solanum virus 3 K.M.Sm.), latent virus also typically present. General. Strains differ in intensity of symptoms, including both mottling and crinkling.

Mottle (acronecrosis, top necrosis) -- virus (Marmor dubium Holmes, Solanum virus 1 K.M.Sm., potato virus X, latent virus). Universal and nearly or quite symptomless in the older commercial potato varieties of the U.S.; new varieties grown from seed generally free. Most strains cause top necrosis (streak) when first introduced into a variety, subsequently some become more or less completely masked, some cause mottling or necrotic spotting.

Net necrosis -- diffuse vascular necrosis in tubers, usually a transitory symptom of leafroll infection in certain vars., as Green Mountain, sometimes of purple-top or yellow-top; may also result from psyllid yellows.

Psyllid yellows. See following section.

Purple-top (blue-stem, ? purple dwarf) -- virus, typically the east-

Solanum cont.

ern strain of aster yellows (Chlorogenus callistephi var. vulgaris Holmes, Callistephus virus 1 K.M.Sm.), reported in Me., N.J., N.Y., Pa., and W.Va.; this or other strains, or perhaps other viruses, may be the cause of purple-top as reported in the Central States from Mich. to Nebr., Okla., and N.Dak.

Ringspot -- virus, in part tobacco ringspot (Marmor annularium McK., Nicotiana virus 12 K.M.Sm., yellow strain), reported in Ky. and Va.; in part a strain of potato mottle virus, reported as virulent ringspot and punctate necrosis in Wis. and Minn.; also unidentified virus in Colo., Wyo. "Potato ringspot", as usually reported, refers to the symptoms induced in tobacco by certain strains of potato mottle virus, not to ringspot symptoms in potato.

Rugose mosaic, severe mosaic (acropetal necrosis, leaf-drop streak, veinbanding) -- virus (Marmor cucumeris var. upsilon Holmes, Solanum virus 2 K.M.Sm., potato virus Y), mottle or X virus typically present, latent or intensifying the symptoms. General, but more frequent in the South and intermediate potato areas, less so in the far North. Strains differ in symptoms, especially the extent of necrosis, so that the cited names refer to closely related, not necessarily identical viruses. The term veinbanding refers to symptoms induced in tobacco.

Russet dwarf -- virus. Ida. Probably rugose mosaic.

Spindle tuber -- virus (Acrogenus solani var. vulgaris Holmes, Solanum virus 12 K.M.Sm.). General.

Spindling sprout -- in part virus, equivalent to hair sprout; may also refer to sprout attenuation induced by other viruses as aster yellows, potato witches'-broom and leafroll, or by other diseases, as psyllid yellows.

Spot necrosis -- strain of potato mottle virus that causes necrotic spotting in tobacco, reported in Wis., Ky., and probably elsewhere. Punctate necrosis, reported on potato in Wis., is caused by another strain of this virus.

Spraing (concentric necrosis, certain forms of internal browning) -- perhaps virus, but see Nonparasitic Diseases.

Stem-end browning -- perhaps virus but see Nonparasitic Diseases.

Streak -- virus, usually rugose (severe) mosaic together with mottle virus, equivalent to leaf-drop streak; another type, more accurately acronecrosis, is caused by mottle virus in hypersensitive varieties.

Unmottled curly dwarf -- virus (Acrogenus solani var. severus Holmes, Solanum virus 13 K.M.Sm.). Me. (rare), Mont., Nebr., N.Dak., Ore.

Veinbanding. See Rugose mosaic.

Witches'-broom -- virus (Chlorogenus solani Holmes, Solanum virus 15 K.M.Sm.). Chiefly in the Northwestern and North Central States, Mich. to Iowa, Tex., and Wash.; also Fla., Me. and W.Va. from western seed potatoes.

Solanum cont.

Yellow dwarf -- virus (Marmor vastans Holmes, Solanum virus 16 K.M.Sm.). Eastern and North Central States, Me. (rare) to Va., Ind. and Minn.; also Fla., reported but uncertain in Mont., S.Dak. and Wyo. Two strains differing in vector relationships are recognized but the symptoms on potato are similar.

Yellow-top -- unidentified virus related to aster yellows or witches'-broom, perhaps synonymous with apical leafroll. Me., Nebr., Mont.

Potatoes have been experimentally infected in the U.S. with the following viruses, but records of natural occurrence are lacking or doubtful: cranberry false-blossom, cucumber mosaic, tobacco common mosaic and etch, tomato big-bud and spotted-wilt.

NONPARASITIC AND MISCELLANEOUS

Blackheart -- physiological, induced by oxygen deficiency usually with concomitant high temperature. Occasional in transit and storage, sometimes in the field following flooding or overheating.

Blackening after cooking -- physiological, variously attributed to climatic effects -- drought, heat, deficient light -- during tuber growth; also to potassium deficiency, and to chilling in early storage period; in part genetic. Reported chiefly in the Middle Atlantic and Central States.

Boron deficiency -- impairment of tuber quality; in experiments causing chlorosis and tip blight. N.Y. Boron toxicity from fertilizer has also been observed in Me., N.J. and N.Y.

Checking (skin-roughening, soil scurf) -- in part physiological, attributed to fertilizer injury, soil alkalinity and other factors, in part probably parasitic -- see Actinomyces, Rhizoctonia and Spondylocladium.

Giant hill -- oversized, late-maturing plants, usually yielding few and sometimes misshapen tubers; attributed to genetic factors (bud mutation). Occasional in all potato areas, more frequent in the North.

Glassy end -- starch deficiency and high water content, usually at stem end, sometimes bud end, of elongated tubers; physiological, associated with immaturity and second growth. Jelly-end rot is a further development involving infection by Rhizoctonia, Fusarium, and Pythium. Calif., Ida.

Growth cracks -- physiological, due chiefly to fluctuating moisture. Occasional in irrigated potato districts and those with marked climatic variations.

Hollow heart -- physiological, typically in oversized tubers induced by excessive soil moisutre and fertility, with growth

Solanum cont.

continuing beyond the normal period of maturity.

Hopperburn -- leaf-tip and marginal necrosis caused chiefly by feeding of the potato leafhopper, Empoasca mali LeBaron. General in the intermediate potato areas of the Middle Atlantic, Central, and Western States, rare in the far North and early crop in the South. See also Potassium deficiency and Tipburn.

Internal blackening -- discoloration evident in uncooked tubers (distinct from "blackening-after-cooking") attributed to mechanical injury, as pressure or bruising. Occasional in transit.

Internal brown spot (physiological brown spot, rust spot) -- discoloration and necrosis, without external symptoms, of tuber parenchyma, attributed to various physiologic factors such as temperature and moisture fluctuations during growth, soil acidity, light or muck soils, and mineral deficiencies (calcium, phosphorus); necrotic patterns distinct from net necrosis (virus), stem-end browning (? virus), frost necrosis, and usually from concentric necrosis or spraing. Occasional in all potato areas.

Knobbiness, "second growth" -- attributed to extreme fluctuations in soil moisture, or to other factors inducing periodic growth; some virus diseases, as witches'-broom, and psyllid yellows also may cause branching and indeterminate tuber growth. Occasional in all potato areas.

Lenticel enlargement -- caused by wet soil or oxygen deficiency. Occasional.

Magnesium deficiency -- chlorosis and leaf-drop. Chiefly in sandy soils in the Atlantic Coast States from Me. to S.Car.

Lightning injury -- Occasional, chiefly in Northeastern and Central States.

Mahogany browning -- form of low temperature injury characteristic of certain vars. Me.

Manganese toxicity -- stem necrosis and defoliation, observed in acid soil. Wis.

Pitting -- superficial spot-necrosis of tubers, attributed to oxygen deficiency in storage. N.Y., Wash.

Potassium deficiency -- bronze coloration and marginal necrosis of foliage, sometimes bluish discoloration of tubers. Reported chiefly on sandy soils in the Atlantic Coast States from Me. to S.Car., also Calif., Minn., Wash.

Psyllid yellows -- systemic plant injury with abnormal growth and sprouting of tubers (not tuber perpetuated) induced by feeding of potato psyllid, Paratrioza cockerelli (Sulc.). Western States from N.Dak. to Tex., Calif. and Ida., especially in Colo., Utah, and Wyo. See also Hair sprout.

Scald -- tuber injury caused by overheating and sunburn, usually followed by bacterial decay. Frequent in southern potato areas, Fla. to Tex., and in Calif. and Kans.; occasional in Eastern and Central States.

Solanum cont.

Spraing (concentric necrosis) -- form of internal brown spot (q.v.) with mostly peripheral, arc-shaped lesions but not clearly distinguished from other types; tuber transmission claimed, perhaps of virus origin. Calif., N.Y.

Sprout-tubers ("little potato", potatoes without tops) -- physiological, attributed to storage of seed tubers at above-optimum temperature and sprouting in dry, cold soil. Occasional in all potato areas, reported in Ky., Md., Mich., N.J., N.Y., N.Car., Ore., Pa., S.Car., Va., Wash.

Stem-end browning -- vascular necrosis near stolon attachment of tubers, cause unknwon, direct or predisposing effect of a virus suggested. Me. Stem-end discoloration may result also heat, drought and infection by various fungi.

Tipburn -- physiological caused by abrupt transition from cool and moist to hot and dry weather; often accompanies hopperburn, but may occur in absence of leafhoppers. General.

Walnut toxicity -- wilting caused by toxic root excretion of black walnut trees (Juglans nigra L.) N.Y.

(Next family, Umbelliferae)

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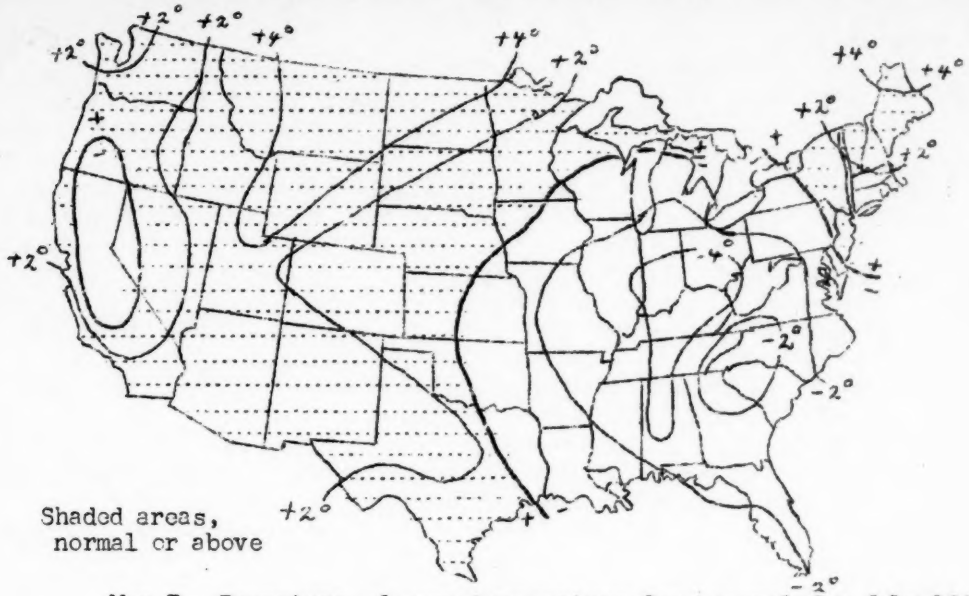
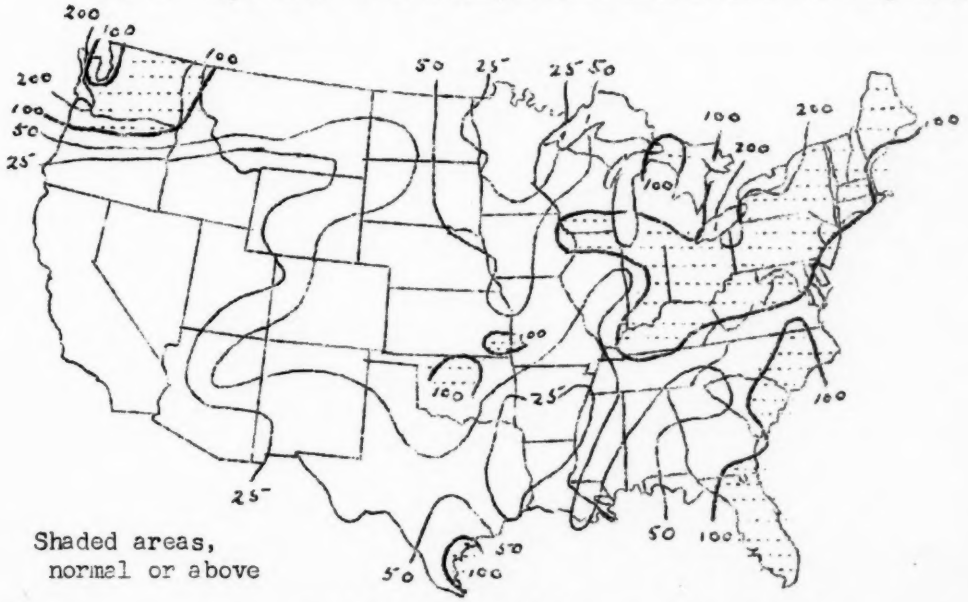


Map I. Departure of mean temperature from normal for July 1947



Map II. Percentage of Normal Precipitation for July 1947

JULY WEATHER

(The above maps from U. S. Department of Commerce, Weather Bureau, Weather and Crop Bulletin for the week August 5, 1947).

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